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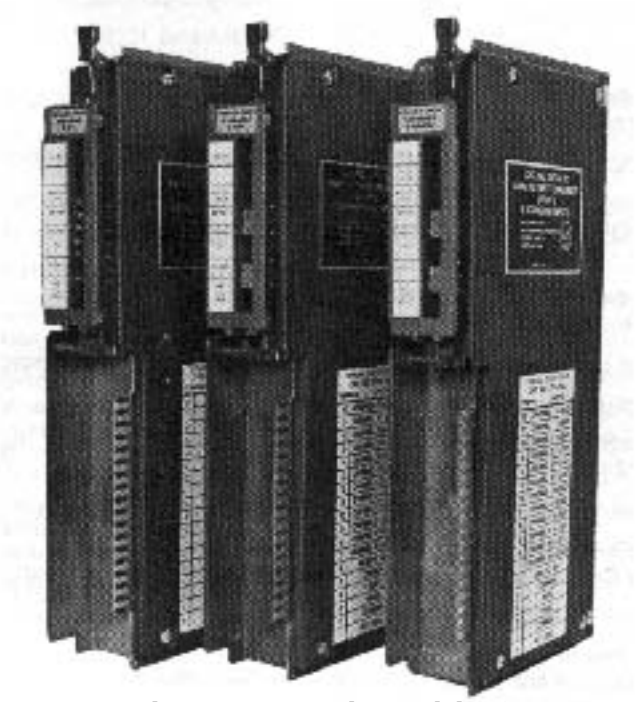
Analog Input Expander Modules

(Cat. No. 1771-E1, -E2, -E3)

Product Data



Introduction

Analog Input Expander Modules (cat. no. 1771-E1 -E2, -E3) are used with an Analog Input Module (12-bit) Assembly (cat. no. 1771-IF, series B). They provide a cost effective means of expanding the analog input capacity of a PC system.

When using block transfer programming, you can use up to eight expander modules with each analog input module. This allows as many as 64 analog inputs (using 1771-E1 expanders) per analog input module. When using single transfer programming, you can use up to eight expander modules with each analog input module.

Each Bulletin 1771 I/O chassis can contain up to two expanded 1771-IF analog input modules, provided that they are compatible with the other modules in the chassis. For details regarding module compatability, refer to the Analog Input Systems User's Manual (publication 1771-803).

The cat. no. 1771-E1 analog input expander module provides 8 single-ended inputs. It consists of the following hardware:

- Analog Input Expander (12-bit) 8 Single-Ended Inputs (cat. no. 1771-E1C)
- Field Wiring Arm (cat. no. 1771-WF)
- Product Data (publication 1771-942)

The cat. no. 1771-E2 analog input expander module provides 6 differential inputs. It consists of the following hardware:

- Analog Input Expander (12-bit) 6 Differential Inputs (cat. no. 1771-E2C)
- Field Wiring Arm (cat. no. 1771-WF)
- Product Data (publication 1771-942)

The cat. no. 1771-E3 analog input expander module provides 6 two wire sourcing inputs. It consists of the following hardware:

- Analog Input Expander (12-bit) 6 Sourcing Inputs (cat. no. 1771-E3C)
- Field Wiring Arm (cat. no. 1771-WF)
- Product Data (publication 1771-942)

Operation

An analog input expander module acts as a data collector for an associated 1771-IF analog input module. It multiplexes its inputs into a single output signal. This signal is then transmitted via cables to an analog input module. The expander module communicates with the analog input module on the I/O chassis backplane.

Installation

Installation of analog input expander modules includes selecting master number, module number, number of channels, input and output ranges, inserting the module in a 1771I/O chassis, connecting input and interconnect cables, and keying the I/O chassis. The following paragraphs describe the installation of analog input expander modules.

Master Number Selection

Each input expander module sends its data to one analog input module. The 1771-IF, series B analog input module is designated as either Master 1 or Master 2. If you plan to connect the input expander module to Master 1, place a programming plug in the Master 1 position. If you plan to connect the input expander module to Master 2, place a programming plug in the Master 2 position.

Module Number Selection

Each Analog Input Expander Module (cat. no. 1771-E1, -E2, -E3) associated with the same analog input module must be assigned a different module number. To assign a module number to an input expander module, place programming plugs in the positions specified in table A. Assign module numbers consecutively, beginning with number 1, and don't forget to write the module number on the front panel of the module for future reference. The module number must be between 1 and 8.

Table A
Module Number Selection

Expander Number	Programming Plug Position		
	M2	M1	M0
1	0	0	0
2	0	0	1
3	0	1	0
4	0	1	1
5	1	0	0
6	1	0	1
7	1	1	0
8	1	1	1

Channel Selection

Before connecting your input expander modules, you need to select the number of inputs which will be used. Select the number of channels by placing programming plugs in the positions specified in table B.

Table B
Channel Selection

Number of Channels	Programming Plug Position		
	C2	**C1**	**C0**
1	0	0	0
2	0	0	1
3	0	1	0
4	0	1	1
5	1	0	0
6	1	0	1
7[1]	1	1	0
8[1]	1	1	1

[1] Defaults to 6 for 1771-E2 or 1771-E3.

Output Range Selection

The output range of the analog expander module must match the input range of the associated analog input module. You can select an output range to match any input voltage range of the 1771-IF analog input module. To select the output range, place programming plugs in the positions specified in table C.

NOTE: The analog input module must be configured for a voltage range for use with input expander modules. If it is configured for a current range, change it to a voltage range as described in the Analog Input System (cat. no. 1771-IF and 1771-El, E2, E3) User's Manual (publication 1771-803).

Changing the output range does not require that the expander module be recalibrated.

Table C
Output Range Selection

Output Range	Programming Plug Position
+1 to +5V DC	G, H, I, K, L
0 to +5V DC	G. H, I
± 10V DC	F
0 to +10V DC	G, I

Input Range Selection

You can select one of the following input ranges for each 1771E1 or 1771-E2 input expander module:

- -5 to +5V DC
- 0 to +5V DC
- +1 to +5V DC
- -10 to 10V DC
- 0 to +10V DC
- +4 to +20mA
- 0 to +20mA
- -20 to +20 mA

Table D shows the programming plug positions for each range. When selecting a current range, be sure to use the S1 thru S8 positions for 1771-E1 expander modules and the D1 thru D6 positions for 1771-E2 expander modules.

Table D
Input Range Selections (1771-EI, -E2)

Voltage Range	Current Range[1]	Programming Plug Position
+1 to +5V DC	+4 to +20mA	A, C, D, E
0 to +5V DC	0 to +20mA	A, C
-10 to +10V DC		No plugs
0 to +10V DC		C
-5 to +5V DC	-20 to +20MA	B

[1] To select a current range for a given channel, place a programming plug in the corresponding current range position The current range positions for 1771-E1 expander modules are labeled S1 thru S8 for channels 1 thru 8 respectively The current range positions for 1771 -E2 expander modules are labeled D1 thru D6 for channels 1 thru 6 respectively

Two current ranges are available with 1771-E3 input expander modules: 0 to +20mA and +4 to +20 mA. The programming plug positions for these ranges are shown in table E.

Changing the input ranges does not require that the expander module be recalibrated (although the module calibration must still be checked annually to maintain the specified accuracy).

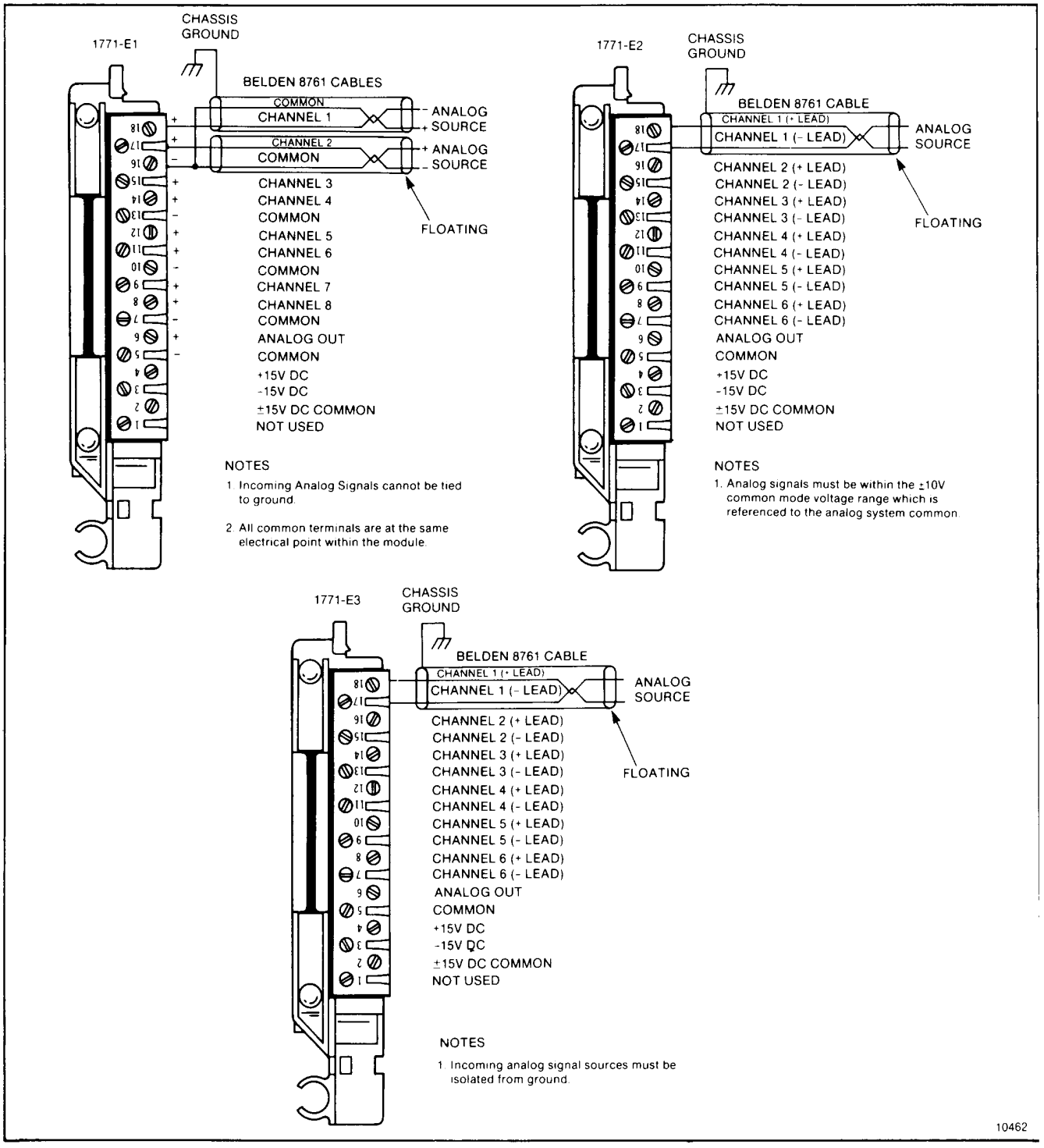
Table E
Input Current Range Selections (1771-E3)

Input Range	Programming Plug Position
+4 to +20mA	A, C, D, E
0 to +20mA	A, C

Input Connections

Connect inputs to the wiring arm of input expander modules as shown in figure 1. Use consecutive channels beginning with channel 1. For example, if you only use three channels on the expander module, they must be channels 1, 2, and 3. Also, be sure that the input signals are compatible with the input range selected for the expander module.

Figure 1
Input Connections



Output Connections

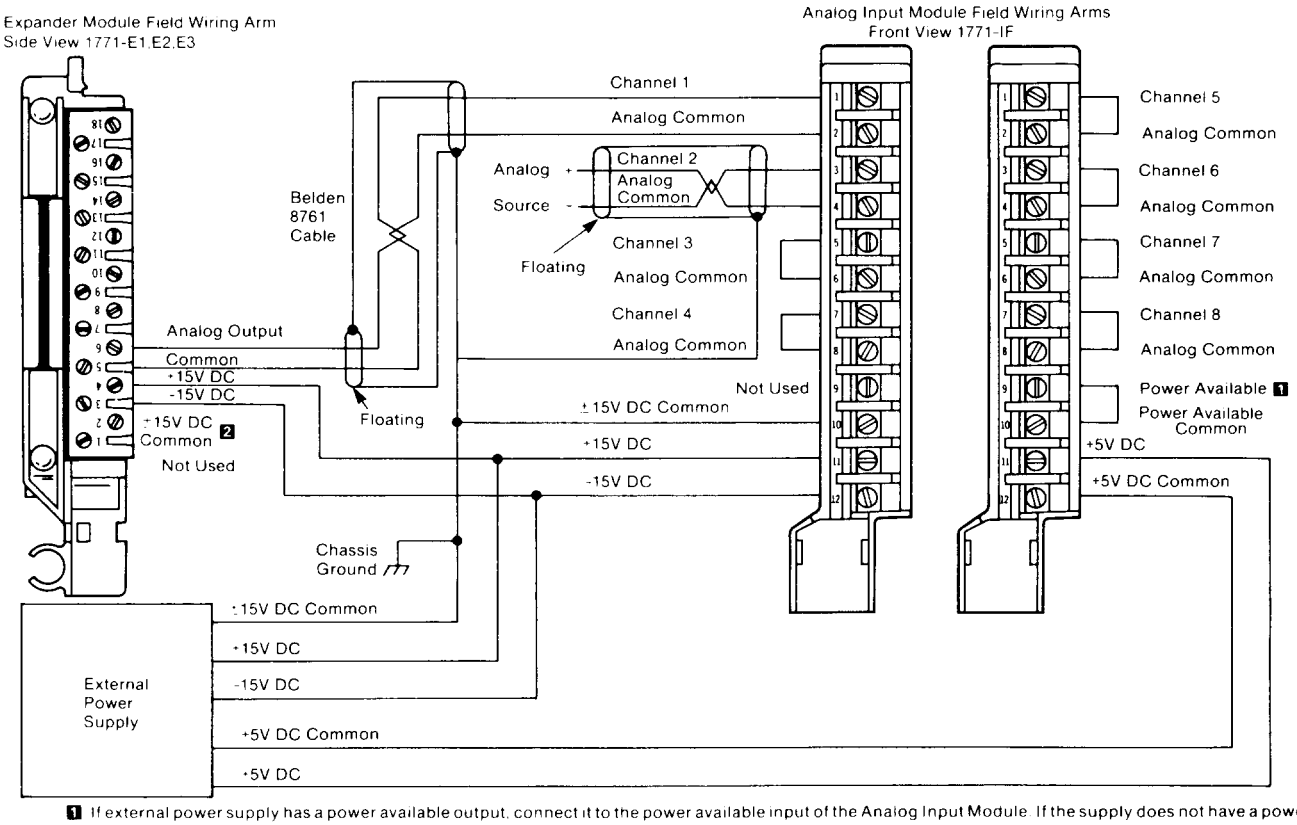
Connect the output of each expander module to the analog input module as shown in figure 2. Be sure to connect each expander module to the corresponding channel of the 1771-IF analog input module. For example, expander module number 1 must be connected to channel 1 of the analog input module.

External Power Supply Connections

External power supply connections are shown in figure 2. If the power supply has a power available output, connect it to the power available terminals of the analog input module. Otherwise, connect these terminals together as shown in figure 2. Also, if you use the same power supply for the expander module and the analog input module, the ±15V DC common terminal on the expander module is unused.

NOTE: All commons are connected internally.

Figure 2
Output and Power Connections



1 If external power supply has a power available output, connect it to the power available input of the Analog Input Module. If the supply does not have a power available output, use a jumper to short the power available terminals of the field wiring arm as shown.

2 ±15V DC common on Expander Module is used if external ±15V power supply connected to Expander Module is the same one that is connected to the Analog Input Module (as shown).

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Keying

After you decide which modules will be placed in each slot of the I/O chassis, you should use keying bands to guard against having the wrong type of module placed in a slot. The keying positions for each type of input expander module is as follows:

cat. no. 1771-E1: 8-10 and 24-26
cat. no. 1771-E2: 2-4 and 12-14
cat. no. 1771-E3: 2-4 and 22-24

Power Requirements

Analog Input Expander Modules (cat. no. 1771-E1, -E2, -E3) require power from both the I/O chassis backplane and an external power supply. You can use either the Power Supply (cat. no. 1770-P1) or the Remote Power Supply (cat. no. 1778-P2) to provide external power to a 1771-E1 or 1771-E2 expander module. For a 1771-E3 expander module, use a Remote Power Supply (cat. no. 1778-P2).

Each expander module requires 150mA from the I/O chassis backplane. Be sure to consider this and the backplane current requirements of other modules in the chassis to ensure that the backplane capacity is not exceeded.

Specifications

Inputs per Module

Cat. No. 1771-E1

- 8 single-ended

Cat. No. 1771-E2

- 6 differential

Cat. No. 1771-E3

- 6 two-wire sourcing

Module Location

- 1771 I/O rack

Input Ranges

Cat. No. 1771-E1 and Cat. No. 1771-E2

- +1 to +5V DC
- -10 to +10V DC
- 0 to +5V DC
- 0 to +10V DC
- -5 to +5V DC,
- +4 to +20mA
- 0 to +20mA
- -20 to +20mA

Cat. No. 1771-E3

- 4 to +20mA and 0 to +20mA

Accuracy

- ±0.05 percent of range (voltage mode)
- ±0.07 percent of range (current mode)

Temperature Coefficient

Cat. No. 1771-E1

- ±35 ppm/°C (voltage mode)
- ±45 ppm/°C (current mode)

Cat. No. 1771-E2

- ±40 ppm/°C (voltage mode)
- ±50 ppm/°C (current mode)

Cat. No. 1771-E3

- ±45 ppm/°C

Input Overvoltage Protection

- ±25V rms (voltage mode)
- ±30mA (current mode)

Common Mode Voltage Cat. No. 1771-E2

- ±10V

Common Mode Refection Ratio Cat. No. 1771-E2

- 80 dB, DC to 120Hz (voltage mode)
- 20V pp, DC to 120Hz (current mode)

Input Impedance Cat. No. 1771-E1 and Cat. No. 1771-E2

- 10^9 ohms (voltage mode)
- 250 ohms (current mode)

Internal Loop Impedance Cat. No. 1771-E3

- 285 ohms

Maximum External Loop Impedance Cat. No. 1771-E3[1]

- 1000 ohms for 20mA

Backplane Power Supply Current Requirement

- 5V DC +150mA

External Power Supply Current Requirement Cat. No. 1771-E1 And Cat. No. 1771-E2

- +15V DC 50mA
- -15V DC 50mA

Cat. No. 1771-E3[2]

- +15V DC 200mA
- -15V DC 200mA

Ambient Temperature Ratings Operational

- 0°C to 60°C (32°F to 140°F)

Storage

- -40°C to 85°C (-40°F to 185°F)

Relative Humidity Rating

- 5 to 95% (without condensation)

Electrical Isolation

- 1500V rms, (transient)

Keying

Cat. No. 1771-E1

- 8-10 and 24-26

Cat. No. 1771-E2

- 2-4 and 12-14

Cat. No. 1771-E3

- 2-4 and 22-24

Output to 1771-IF Series B

- +1 to +5V DC
- -10 to +10V DC
- 0 to +10V DC 0 to +5V DC

[1]The 1000 ohms is the maximum external loop impedance at which the cat. no. 1771-E3 expander module can source +20mA/ This impedance is also dependant upon the isolated transmitter's specifications. Refer to transmitter data sheets for further information.

[2]The cat. no. 1771-E3 expander nodule provides six 26V DC 2-wire sourcing inputs for use with 2-wire transmitters. The 26V DC is derived from the 30V difference between the +15V and -15V external power supply.

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